October 2001

Iran

Iran is OPEC's second largest oil producer and holds 9% of the world's oil reserves and 15% of its gas reserves. Additionally, Iran is a focal point for regional security issues.

Information contained in this report is the best available as of October 2001 and is subject to change.

GENERAL BACKGROUND

Iran's economy, which relies heavily on oil export revenues (around 80% of total export earnings, 40%-50% of the government budget, and 10%-20% of GDP), was hit hard by the plunge in oil prices during 1998 and early 1999, but with the rebound in oil prices since then, has recovered to a large degree. For 2000, Iran's real GDP grew by around 5%-5.9%; for 2001 it is expected to grow at a slightly lower, but still robust 4.4% rate. Iran's economy is being adversely affected by a second consecutive year of drought, and its impact on the country's agricultural sector. Iran's currency, the rial, has been relatively strong as well (with a unification of the two major exchange rates -- official and "floating" -- scheduled for 2002), and the country is enjoying large trade surpluses. On the negative side, inflation remains fairly high at around 14%. On February 11, 2001, the Iranian government approved a $56 billion budget for the new Iranian Fiscal Year, beginning March 21.

For 2001, Iran's oil export revenues are expected to reach $22.8 billion, down slightly from $23.6 billion in 2000, but up 121% from lows reached in 1998. Despite relatively high oil export revenues, Iran continues to face budgetary pressures, a rapidly growing, young population with limited job prospects and high levels of unemployment; heavy dependence on oil revenues; significant external debt (including a high proportion of short-term debt); high levels of poverty; expensive state subsidies on many basic goods; a large, inefficient public sector and state monopolies (bonyads, which control at least a quarter of the economy and constitutionally are answerable only to supreme leader

Ayatollah Ali Khamenei); international isolation and sanctions. To cope with its economic problems, Iran's government has proposed a variety of privatization and other restructuring and diversification measures, although these remain politically contentious. Iran also has set up a "stabilization fund" for above-budget oil revenues, which amounted to billions of dollars in 2001. Finally, Iran has expressed interest in joining the World Trade Organization (WTO), although this would require that significant, and politically problematic, economic reforms be carried out by Iran.

In September 1999, President Khatami announced an ambitious program to privatize several major industries, including communications, post, rail, petrochemicals, and even upstream oil and gas to an extent, as part of the "total restructuring" of the Iranian economy called for in the country's latest five-year economic plan (which began in March 2000). The five-year plan also targets the creation of 750,000 new jobs per year, average annual real GDP growth of 6% over the period, reduction in subsidies for basic commodities (bread, rice, sugar, vegetable oil, wheat, fuels), plus a wide range of fiscal and structural reforms. Implementation of these plans, however, has been delayed in the past by lack of domestic political consensus (as well as the Iranian constitution). In November 1999, the powerful (and conservative) "Council of Guardians" rejected a bill which would have exempted foreign companies in an offshore free-trade zone from threats of nationalization. More recently, the Council of Guardians vetoed planned reforms to Iran's mining sector. In August 2001, Iran's new Economy Minister, Tahmasb Mazaheri, called for the creation of a privatization organization, and said that unemployment was unacceptably high.

Iran is attempting to diversify by investing some of its oil revenues in other areas, including petrochemicals. Iran's non-oil exports appear to have increased significantly in recent years. Iran also is hoping to attract billions of dollars worth of foreign investment to the country by creating a more favorable investment climate (i.e., reduced restrictions and duties on imports, creation of free-trade zones). In May 2001, the Majlis approved the "Law on the Attraction and Protection of Foreign Investment," which aims at encouraging foreign investment by streamlining procedures, guaranteeing profit repatriation, and more. This Law is the first foreign investment act passed by Iran since the 1978/79 revolution, and supercedes decades of legislation. Also in May 2001, the Majlis and Council of Guardians approved a bill allowing Iran to accede to the New York Convention, which is a UN agreement on foreign arbitration awards.

On February 18, 2000, Iran held its sixth parliamentary elections since the 1978/79 revolution, with an overwhelming victory for the reformist coalition. Presidential elections were held in June 2001, and President Khatami won reelection by a wide margin. In July 2001, Iran's cabinet approved formation of a "Supreme Energy Council" (SEC), which would consist of ministers from the oil, energy, economy, commerce, mines and industries ministries, among others. The SEC would play a strategic role in overseeing Iranian energy projects.

Sanctions

The U.S. Iran-Libya Sanctions Act (ILSA) of 1996 imposes mandatory and discretionary sanctions on non-U.S. companies investing more than $20 million annually in the Iranian oil and gas sectors. Also, in 1995, President Clinton signed executive orders prohibiting U.S. companies and their foreign subsidiaries from conducting business with Iran, while banning any "contract for the financing of the development of petroleum resources located in Iran." In response, U.S.-based Conoco was forced to abrogate a $550-million contract to develop Iran's offshore Sirri A and E oil and gas fields. Following this, France's Total and Malaysia's Petronas were awarded the contract. On August 19, 1997, Executive Order 13059 reaffirmed that virtually all trade and investment activities by U.S. citizens in Iran are prohibited. In March 2000, U.S. Secretary of State Albright announced that the United States would lift certain sanctions against Iranian luxury goods. Other sanctions remain in effect, however. In late July 2001, the U.S. Congress voted overwhelmingly to renew ILSA for five more years.

OIL

Iran holds 90 billion barrels of proven oil reserves, or roughly 9% of the world's total. The vast majority of Iran's crude oil reserves are located in giant onshore fields in the Khuzestan region near

the Iraqi border and Persian Gulf terminus. Current Iranian production is accounted for by the following fields: Ahwaz-Bangestan (250,000 bbl/d currently, with plans to increase to 600,000 bbl/d over the next 8 years at a cost of $2.5 billion), Marun, Gachsaran, Agha Jari, and Bibi Hakimeh. Most of Iran's crude oil is low in sulfur, with gravities in the 30°-39° API range. During the first seven months of 2001, Iran produced about 3.9 million bbl/d of oil, around 100,000 bbl/d above its average output of 3.8 million bbl/d for 2000. Iran's current sustainable crude oil production capacity is estimated at around 3.9 million bbl/d, which is nearly 500,000 bbl/d above Iran's latest (September 1, 2001) OPEC production quota of 3.406 million bbl/d. In August 2001, Iran's oil minister denied a report (in *Middle East Economic Survey*) that Iranian production had hit 4.1 million bbl/d. With consumption of about 1.2 million bbl/d, Iran currently is a net exporter of around 2.7 million bbl/d. Around half of Iran's oil exports go to Asian markets, with the remainder going to Europe and Africa.

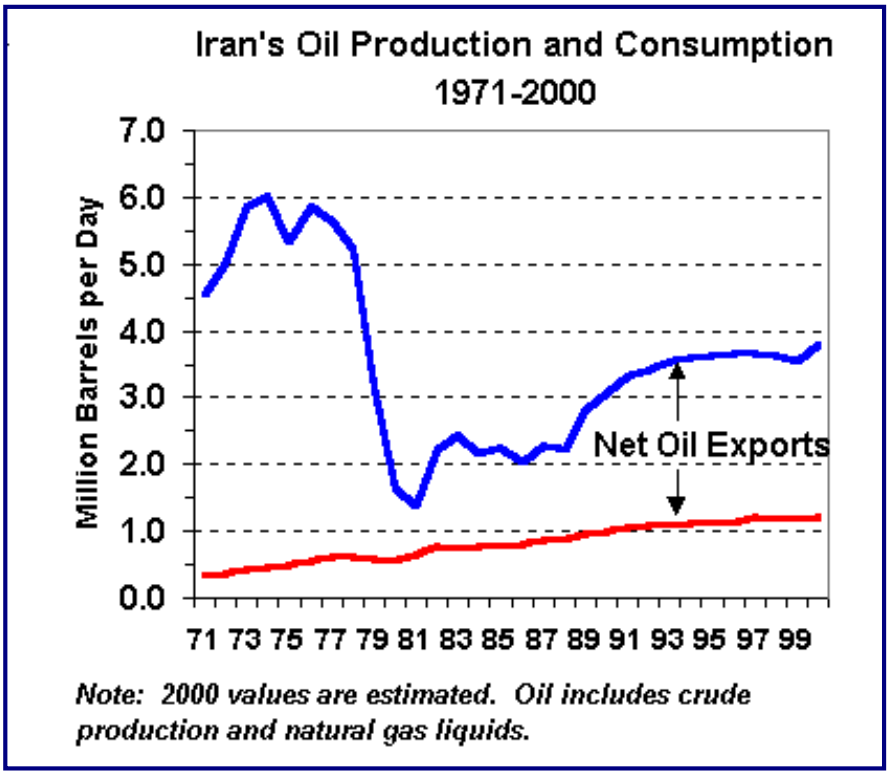
It is possible that with sufficient investment, Iran could increase its oil production capacity significantly. Iran produced 6 million bbl/d in 1974, but has not surpassed 3.8 million bbl/d on an annual basis since the 1978/79 Iranian revolution. It is believed that Iran may have maintained production levels at some older fields only by using methods which have permanently damaged the fields. Also, Iran's oilfields are -- according to Oil Minister Zanganeh -- experiencing a depletion rate of 250,000-300,000 bbl/d per year, and are in need of upgrading and modernization. Despite these problems, Iran has ambitious plans to double national oil production -- to around 8 million bbl/d -- by 2020, and is counting on foreign investment to do so. Over the next four years, Iran is aiming to double foreign investment in the hydrocarbons sector to $24 billion.

In October 1999, Iran announced that it had made its biggest oil discovery in 30 years, a giant onshore field called Azadegan located in the southwestern province of Khuzestan, a few miles east of the border with Iraq. According to Iran's Oil Minister Zanganeh, the Azadegan field could contain oil reserves of up to 24 billion barrels, with potential production of 300,000-400,000 bbl/d. On November 1, 2000, agreement was reached between Japan and Iran for Japanese firms (Japex and Indonesia Petroleum, both majority-owned by the Japan National Oil Company -- JNOC) to have priority negotiating rights to develop Azadegan. In January 2001, the Majlis approved development of Azadegan by foreign investors using the so-called "buyback" model (see below). A contract was signed in July 2001. In September 2000, the U.S. Treasury Department announced that it was investigating Conoco to determine whether or not the company had violated U.S. sanctions in helping to analyze seismic information collected on Azadegan by NIOC.

Since 1995, NIOC has made several sizable oil discoveries, including the huge (3-5 billion barrels) Darkhovin onshore oilfield, located near Abadan and containing low sulfur, 39° API crude oil. In late June 2001, Italy's ENI signed a nearly $1 billion, 5 1/2-year buy-back deal to develop Darkhovin. ENI has a 60% stake in the project, with NIOC holding the remaining 40%. Ultimately, production at Darkhovin is expected to reach 160,000 bbl/d.

In other news related to "buy-back" deals, Spain's Cepsa is set to develop the Cheshmeh-Kosh field for $300 million. Cepsa is to raise crude production at the field from 30,000 bbl/d to 80,000 bbl/d within four years. Also, a deal to develop Bangestan is possible in 2002. Bidders include TotalFinaElf, Shell, and BP.

In February 2001, NIOC announced the discovery of a very large offshore oil field, named Dasht-e Abadan, in shallow waters near the port city of Abadan. According to a top NIOC official, Dasht-e Abadan could contain reserves "comparable" in size to Azadegan.



Foreign Investment

The Iranian constitution prohibits the granting of petroleum rights on a concessionary basis or direct equity stake. However, the 1987 Petroleum Law permits the establishment of contracts between the Ministry of Petroleum, state companies and "local and foreign national persons and legal entities." "Buyback" contracts, for instance, are arrangements in which the contractor funds all investments, receives remuneration from NIOC in the form of an allocated production share, then transfers operation of the field to NIOC after the contract is completed. This system has drawbacks for both sides: by offering a fixed rate of return, NIOC bears all the risk of low oil prices. If prices drop, NIOC has to sell more oil or gas to meet the compensation figure. At the same time, companies have no guarantee that they will be permitted to develop their discoveries, let alone operate them. U.S. law permits American companies to buy the bid packages ($10,000 each), but not to submit proposals. In late August 2000, Iran's deputy oil minister, Seyyed Mehdi Hoseyni, said that $8 billion worth of buyback contracts on various oil reservoirs would be finalized soon (an estimated $10 billion in buyback deals reportedly had been signed to that point). Projects include the following oilfields: Salman, Darkhovin, Sa'databad-Sarvestan, Cheshme-Kosh, Foroozan-Esfandiar, and Dehloran. Recently, Iran appears to have had some second thoughts about buybacks (including charges of corruption, insufficient benefits to Iran, and also worries that buybacks are attracting too little investment), and reportedly is considering substantial changes (or even abolition) of the system. Also, as of April 2001, no buyback contract had been signed for more than a year.

The first major project under the buyback investment scheme became operational in October 1998, when the offshore Sirri A oil field (operated by Total and Malaysia's Petronas) began production at 7,000 bbl/d (Sirri A currently is producing around 20,000 bbl/d). The neighboring Sirri E field began production in February 1999, with production at the two fields expected to reach 120,000 bbl/d.

In April 1999, Iran awarded Canada's Bow Valley Energy, along with the former Elf Aquitaine (now TotalFinaElf), a buyback contract to develop the offshore Balal field. The field, which contains some 80 million barrels of reserves, will produce up to 40,000 bbl/d, possibly by the end of 2002. In February 2001, ENI-Agip acquired a 38.25% share in Balal from TotalFinaElf, which continues to hold a 46.75% stake in the field. Bow Valley holds a 15% share.

In March 1999, France's Elf Aquitaine and Italy's ENI/Agip were awarded a $1-billion contract for a secondary recovery program at the offshore, 1.5-billion-barrel Doroud oil and gas field near Kharg Island. The program is intended to boost production from current levels of around 130,000 bbl/d to as high as 220,000 bbl/d within four years.

In November 2000, Norway's Statoil signed a series of agreements with NIOC to explore for oil in the Strait of Hormuz area. The two companies also will cooperate on developing a gas-to-liquids

processing plant for four southern onshore fields, and possibly will develop the Salman offshore field at a cost of $850 million, with eventual production of 130,000 bbl/d. Iran appears to be accelerating its plans to boost production of natural gas liquids (NGL), as well as liquefied petroleum gas (LPG). NGL expansion plans, including a $500 million plan to build two NGL plans on the south coast of Iran, are aimed mainly at making ethane feedstock available for Iran's growing petrochemical industry.

As of early October 2001, Australia's BHP Billiton Ltd. appeared close to signing a $359 million buyback contract to develop Foroozan-Esfandiar. BHP Billiton would be expected to increase production at the fields three-fold, to 150,000 bbl/d, from around 50,000 bbl/d at present.

Onshore Developments

NIOC's onshore field development work is concentrated mainly on sustaining output levels from large, aging fields. Consequently, enhanced oil recovery (EOR) programs, including gas injection, are underway at a number of fields, including Marun, Karanj, and the presently inactive Parsi fields. EOR programs will require sizeable amounts of natural gas, infrastructure development, and financing.

Although NIOC has run into difficulties in implementing EOR programs at some of its fields mentioned above (i.e., Agha Jari, Binak, Kupal, and Ramshahr) fields, it has been successful in many other cases. One example is NIOC's development work at Gachsaran, which contains in-place reserves of 53 billion barrels and a large-scale gas injection capacity which should help increase production.

Offshore Developments

The Doroud 1&2, Salman, Abuzar, Foroozan, and Sirri fields comprised the bulk of Iran's offshore output, all of which is exported. Iran plans extensive development of existing offshore fields and hopes to raise its offshore production capacity to 1.1 million bbl/d by 2003 (from around 600,000 bbl/d now). It is estimated that development of new offshore Persian Gulf and Caspian Sea oil fields will require investment of $8-$10 billion.

Aside from acting as a transit center for other countries' oil and gas exports from the Caspian, Iran has potentially significant Caspian reserves of its own, including up to 15 billion barrels of oil and 11 trillion cubic feet of natural gas. It is important to note, however, that almost none of this is "proven" to be recoverable (although preliminary seismic surveys conducted by Lasmo and Shell indicated 2.5 billion barrels of oil). Currently, Iran has no oil or gas production in the Caspian region, although in March 2001, NIOC signed a $226-million deal with Sweden's GVA Consultants and Iran's Sadra to build an oil rig in the Caspian Sea off Mazandaran province. This marks Iran's first exploration attempt in the Caspian. Iran's position is that the Caspian should be divided equally, as opposed to several other Caspian states' position that median lines should be used, as is done in lakes. As of October 2001, no agreement has been reached among Caspian Sea region states on this matter. On July 23, 2001, tensions flared in the Caspian Sea region when an Iranian gunboat intercepted two BP oil exploration vessels off Azerbaijan's coast. Following the incident, BP suspended exploration in the disputed block (which Iran calls Alborz).

The 105-million barrel Balal field, discovered in the 1970s by an ARCO/Murphy consortium, was never developed even though an oil pipeline connecting the field to the Lavan Island export terminal was laid. As mentioned above, Canada's Bow Valley Energy Ltd. is now conducting detailed engineering work, including a 3-D seismic survey, on the Balal field. Balal likely will require extensive water injection and other secondary recovery methods, especially in later years.

On November 14, 1999, Shell announced that it had been chosen for a buyback project to develop the Soroush and Nowrooz offshore oil fields, both of which were closed during the 1980-1988 Iran-Iraq war. These fields are located offshore about 50 miles west of Kharg Island and contain estimated recoverable reserves of around 1 billion barrels of mainly heavy oil. Soroush was one of the original 11 projects put out for tender by NIOC in 1995, and the project calls for Shell to increase output at

Soroush-Nowrooz to 150,000 bbl/d by 2003. As of September 2001, Shell reportedly was attempting to move the $800 million Soroush-Nowrooz development project ahead quickly, with first production now expected by November/December 2001.

NIOC also would like to develop five oil and gas fields in the Hormuz region (Henjam A (HA), HB, HC, HD, and HE), the A field near Lavan Island, the Esfandir field near Kharg Island, and two structures near the South Pars gas field. According to NIOC, the five Henjam fields hold an estimated 400 million barrels of oil and have a production potential of 80,000 bbl/d. Other Iranian oil fields slated for increases include Doroud, Nosrat, Farzam, and Salman (to 130,000 bbl/d by 2004 from 105,000 bbl/d at present).

Refining and Transportation

As of January 2001, Iran had nine operational refineries with a combined capacity of 1.48 million bbl/d. In order to meet burgeoning domestic demand for middle and light distillates, Iran has imported refined products since 1982, and is attempting to boost its refining capacity to 2 million bbl/d. Two planned grassroots refineries include a 225,000-bbl/d plant at Shah Bahar and a 120,000-bbl/d unit on Qeshm Island. The $3-billion Shah Bahar refinery project was approved by the government in late 1994 and would be built by private investors.

Iran exports crude oil via four main terminals -- Kharg Island (by far the largest), Lavan Island, Sirri Island, and Ras Bahregan. Refined products are exported via the Abadan and Bandar Mahshahr terminals. Many Iranian oil export terminals were damaged during the Iran-Iraq War, but all have been rebuilt. Iran operates the largest oil tanker fleet within OPEC, with 25 ships.

Crude Swaps

In order to get around restrictions in dealing with Iran, several firms have proposed oil "swaps" involving the delivery of Caspian (Azeri, Kazakh, Turkmen) oil to refineries in northern Iran, while the same amount of Iranian oil is exported through Persian Gulf terminals. According to Iranian Oil Minister Bijan Namdar-Zangeneh, Iran is planning to retool its oil infrastructure to accommodate such swaps, including construction of a $400-million, 240-mile pipeline from the Caspian area via Iran's Caspian port of Neka to refineries in northern Iran and to Tehran. In February 2000, the National Iranian Oil Company (NIOC) awarded a Chinese consortium (led by Sinopec and CNPC) a $100-million contract for technical aspects of the project, which is expected to transport 175,000 bbl/d of Caspian crude by the end of 2002, and possibly up to 380,000 bbl/d (at a cost of $220 million). European oil trading company Vitol is involved in financing the project. Iran also plans to boost capacity at its northern refineries at Arak, Tabriz, and Tehran to about 800,000 bbl/d in order to process this oil. Currently, however, despite capacity of around 50,000 bbl/d, only 15,000-20,000 bbl/d of Turkmen oil are being shipped to Neka, and then on to Tehran by the existing Neka-Tehran pipeline. An equivalent amount of Iranian oil is then made available for export via Kharg Island terminal on the Persian Gulf.

NATURAL GAS

Iran contains an estimated 812 trillion cubic feet (Tcf) in proven natural gas reserves -- the world's second largest and surpassed only by those found in Russia. The bulk of Iranian gas reserves are located in non-associated fields, and have not been developed, meaning that Iran has huge potential for gas development. Besides domestic consumption, which is expected to increase more than 70% by 2005, Iran also has the potential to be a large natural gas exporter. In 1999, Iran produced about 1.9 Tcf of natural gas. Currently, natural gas accounts for around 44% of Iran's total energy consumption, but the government plans billions of dollars worth of investment in the gas sector during its current Five-Year Development Plan.

Iran's largest non-associated natural gas field is South Pars, geologically an extension of Qatar's 241-Tcf North Field. South Pars was first identified in 1988 and originally appraised at 128 Tcf in the early 1990s. Current estimates are that South Pars contains around 280 Tcf of gas, of which a large fraction will be recoverable, and over 17 billion barrels of liquids. Development of South Pars is

Iran's largest energy project, and already has attracted around $20 billion in investment. Gas from South Pars largely is slated to be shipped north via the planned 56-inch, $500 million, IGAT-3 pipeline (a section of which is now being built by Russian and local contractors), as well as a possible IGAT-4 line, and then reinjected to boost oil output at the mature Aghajari field (output peaked at 1 million bbl/d in 1974, but has since fallen to 200,000 bbl/d), and possibly the Ahwaz and Mansouri fields (which make up part of the huge Bangestan reservoir in the southwest Khuzestan region). South Pars gas also could be exported, both by pipeline and possibly by liquefied natural gas (LNG) tanker.

On September 29, 1997, Total (now TotalFinaElf) signed a $2-billion deal (along with Russia's Gazprom and Malaysia's Petronas) to explore South Pars and to help develop the field during Phase 2 and 3 of its development. NIOC estimates that South Pars has a gas production potential of up to 8 billion cubic feet per day (Bcf/d) from four individual reservoirs. Phase 1, which is being handled by Petropars (owned 60% by NIOC), has been delayed several times and now is scheduled for partial completion by the end of 2002, involves production of 900 million cubic feet per day (Mmcf/d) of natural gas and 40,000 bbl/d of condensate. This first phase is being carried out by the Petroleum Development and Engineering Company (PEDEC), an affiliate of NIOC, while TotalFinaElf's consortium is responsible for Phases 2 and 3. In August 1999, Total signed a $110-million contract with Hyundai Heavy Industries for construction of twin undersea pipelines from South Pars to onshore facilities at Assaluyeh. Work also has begun (also by Hyundai) on a major terminal at Assaluyeh to handle South Pars production from phases 2 and 3. Phases 4 and 5, estimated to cost $1.9 billion each, are being handled by ENI and Petropars, and involve construction (by Aip and Petropars) of onshore treatment facilities at the port of Bandar Assaluyeh. Phases 6 through 8, which are to produce a combined 3 Bcf/d of gas and 120,000 bbl/d of condensate, are being handled by Petropars and, in part, by the UK's Enterprise Oil (which has a 20% stake), while several international bidders reportedly have been short-listed for phases 9 through 12 (in early 2001, Chevron reportedly withdrew its bid on these phases). Phases 9 and 10 are expected to supply the domestic market while phases 11 and 12 are slated for LNG export. Companies reportedly interested in all or parts of phases 9-12 (expected to cost $4 billion) include BG, TotalFinaElf, Petronas, and Shell.

In addition to South Pars, the 48-Tcf North Pars development may also be part of Iran's long-term gas utilization plans. Development plans call for 3.6 Bcf/d of gas production, of which 1.2 Bcf/d would be re-injected into the onshore Gachsaran, Bibi Hakimeh, and Binak oil fields. The other 2.4 Bcf/d would be sent to the more mature Agha Jari oil field. Negotiations on the field stalled in 1995, but Shell reportedly renewed its interest in 1998. A feasibility study on the field is scheduled to be completed in late 2001, and will determine whether or not North Pars gas is needed for injection into mature southern oil fields.

Besides North and South Pars, Iran aims to develop the 6.4-Tcf, non-associated Khuff (Dalan) reservoir of the Salman oil field. Salman straddles Iran's maritime border with Abu Dhabi, where it is known as the Abu Koosh field. NIOC is seeking to develop the Khuff reservoir, which could lead to the production of 500 Mmcf/d of non-associated gas, along with the 120,000 bbl/d of crude oil that is now being produced from a shallower reservoir. Salman gas could either be exported to Dubai's Jebel Ali or to domestic locations at Qeshm Island and Badar Mogham. The project cost is estimated at slightly under $600 million for a two-platform development.

Iran has made several significant gas field discoveries over the past year or so. These include: the 800-Bcf Zireh field in Bushehr province; the 4-Tcf Homa field in southern Fars province; the huge, 14-Tcf Tabnak gas field located in southern Iran. Iran's other sizable non-associated gas reserves include the offshore 47-Tcf North Pars gas field (a separate structure from South Pars), the onshore Nar-Kangan fields, the 13-Tcf Aghar and Dalan fields in Fars province, and the Sarkhoun and Mand fields.

The dual Aghar-Dalan field development has been one of National Iranian Gas Company's recent successful gas utilization projects. Since coming online in mid-1995, the Aghar and Dalan fields have produced approximately 600 Mmcf/d and 800 Mmcf/d, respectively. Gas from both fields is processed at a $300-million gas processing facility at the Dalan field, which is also the location of a

40-MW, gas-fired power plant. Most of the treated gas from the Dalan processing plant is carried through a 212-mile pipeline for re-injection in the Marun field and other oil fields in Khuzestan province.

Natural Gas Trade

Although Iranian domestic consumption is growing rapidly, Iran continues to promote export markets for its natural gas. Possibilities include Turkey, Armenia, Ukraine (Kiev reportedly is interested in building an Iran-Armenia-Georgia-Crimea-Ukraine line), Europe (possibly via Ukraine), Pakistan, India, Taiwan, South Korea, and coastal China. These exports could be either via pipeline or by LNG tanker, with possible LNG export terminals at Asaluyeh or Kish Island. Although India and Iran in 1993 signed a memorandum of understanding on an overland gas pipeline, regional political and security concerns to date have blocked completion of a feasibility study. Reportedly, Pakistan and Iran at one point had agreed to a gas line from South Pars to Multan, Pakistan, with a possible extension to Hazipur-Bijapur-Jagdishpur in northern India. In early February 2001, there were reports that India and Iran were negotiating over an offshore gas pipeline option, which would run from Iran to Gujarat, India. However, this could be much more costly and technically difficult than an overland line. Also, problems at India's Dabhol natural gas power facility have called into question the financial viability of India's LNG import plans. In other news, in August 2001, NIOC awarded Japan's JGC and France's Technip a "front-end" engineering and design contract for an 8-9 million-ton-per-year LNG export plant. This is Iran's third ongoing LNG export project, although it is more likely that only one or possibly two will go forward.

In 1996, Iran and Turkey signed a $20-billion agreement that calls for Iran to supply Turkey with natural gas over a period of 22 years. Exports of Iranian gas to Turkey were slated to start in 1999 at an initial rate of 300 Mmcf/d and rise to a level of 1,000 Mmcf/d in 2005. In November 1998, Turkey began construction of a 623-mile pipeline that could transport gas westward from Iran. In January 2000, Iran said that it accepted Turkey's request to delay the purchase of Iranian natural gas until September 2001 (on August 2, 2000, the two countries signed a protocol for pumping to begin on July 30, 2001). Turkey said that it had been unable to complete its portion of the pipeline due to economic problems. In August 2001, the pipeline opening was delayed once again, with deliveries now set to begin in early December 2001.

In July 2000, Iran's Oil Minister Zanganeh stated that Iran was open to selling gas to Kuwait. Iran has been involved in a border dispute with Kuwait and Saudi Arabia over demarcation of the border through the northern Gulf continental shelf. This region contains the huge (7-13 Tcf) Dorra gas field, which Iran had begun drilling in early 2000 but stopped after complaints by Kuwait. Saudi Arabia and Kuwait signed a bilateral agreement in July 2000 on dividing up the Dorra gas field equally between the two countries, and now are working on a final deal with Iran. Besides Kuwait, Iran also is reported to have discussed possible gas exports to the United Arab Emirates, although in April 2001, NIOC denied such a plan, as has Crescent Petroleum, the UAE company reportedly involved in the deal.

Besides gas exports, Iran also has discussed *importing* gas from Azerbaijan, and already imports some gas from Turkmenistan. This gas is for use in Iran's northern areas, far from the country's main gas reserves in the south. Gas imports from Turkmenistan doubled in early 2001, reaching nearly 80 Bcf in the first half of the year, via the Korpeje-Kurt Kui pipeline.

ELECTRIC POWER

Iran has installed power generation capacity of about around 27 gigawatts (GW), of which the vast majority (90% or so) is thermal (natural gas or oil), and the remainder hydroelectric. As a result of significant state investment in this area, a number of new power plants (mainly hydroelectric and combined cycle) have come online recently in recent years in Iran, including the 2,000-MW Shahid Rai thermal power station in Qazvin; a 1,290-MW combined-cycle plant in Rasht; a doubling of the Tabriz power plant's capacity to 1,500 MW; two, 200-MW, steam-powered units at the Martyr Montazeri plant; a 215-MW steam-powered unit at the Ramin Power Plant; and a 107-MW combined cycle generator at Montazer Qa'em Power Plant. With power demand growing rapidly, Iran is adding

significant generation capacity -- both thermal and hydroelectric. The largest hydro projects are the 3,000-megawatt (MW) Karun 3 plant, the 2,000-MW Godar-e Landar facility, a 1,000-MW station in Upper Gorvand, and the 400-MW Karkheh dam. New thermal projects include two 1,040-MW combined cycle plants in the South, an 1,100-MW combined cycle plant at Arak, and a 1,000-MW facility in Bandar Abbas.

Iran's power consumption is growing at around 7%-8% annually. In response, Iran will need to add significant generating capacity in coming years, at a cost of several billion dollars. Already, around 2,160 MW in generating capacity is scheduled to come online by March 2002. Iran has received offers for investment in the form of loans and build-operate-transfer (BOT) contracts. BOT contracts allow the investing company to build and operate the generating facility for a period of 15-20 years, after which time the plant is turned over to the Energy Ministry. Negotiations have taken place with international energy firms on expansion plans for power plants at Bandar Abbas, Shaid Rajai, Alborz, Ramin, and Kerman.

Although the government has considered privatization, at present Iran's power sector is run by the state-controlled Tavanir organization. Eventually, Tavanir may be broken up into smaller companies as part of a privatization package. In addition to power generation, Tavanir also is responsible for transmission. Iran has main power distribution networks: 1) The Interconnected Network, which serves all of Iran except for remote eastern and southern areas, using 440-kV and 230-kV transmission lines; 2) the Khorassan Network, which serves the eastern Khorossan province; and 3) the Sistan and Baluchistan Network, which serves the remote southeastern provinces of Sistan and Baluchistan. The government goal is to join these three networks into one national grid. Currently, around 94% of Iranians are connected to one of Iran's power grids. Iran also has power links to neighboring countries, including a recent line connecting Parsabad-e Moghan, Iran, and Imishli, Azerbaijan, and exports small amounts of power.

NUCLEAR

Currently, Iran has five small nuclear reactors, one in Tehran and four in Isfahan. Iran claims that its nuclear power is for peaceful purposes and that it will help free up oil and gas resources for export, thus generating additional hard-currency revenues. The U.S. State Department frequently has stated U.S. opposition to Iran's nuclear program. The United States has argued that Iran has sufficient oil and gas reserves for power generation, and that nuclear reactors are expensive, unnecessary, and could be used for military purposes. Iran is a signatory to the Nuclear Non-Proliferation Treaty.

In March 2001, President Khatami met with Russian President Putin and agreed to expand bilateral cooperation on nuclear power. Russia's atomic ministry has been assisting Iran on the Bushehr nuclear power facility. Work on this plant began in 1974 by West Germany, but was halted (80% complete) following the 1978/1979 revolution. Progress on Bushehr resumed when Russia signed a $780-million contract in 1995, as well as an agreement in September 1998 to complete the facility within 52 months. The 1995 contract with Russia calls for completion of the two, 1,300-MW, pressurized-light water units as well as the supply of two modern VVER-440 units. The United States strongly opposes the project and has in the past provided Russia with information pointing to the existence of an Iranian nuclear weapons program. Despite this, the Russians have proceeded, although slowly (in part due to incompatibilities between Russian and German technologies) with work on Bushehr. Under the latest contract details with Russia, construction on Bushehr must be completed by March 19, 2004. Iran reportedly plans to purchase a second Russian-built reactor for Bushehr once the first reactor is finished.

ENVIRONMENT

In the context of its oil-based economy, environmental issues in Iran only recently have become important. Ongoing air pollution in urban areas, which reached a crisis level in Tehran in December 1999, have highlighted the need to improve Iran's environmental record. The rush to develop oil and gas resources in the Caspian Sea makes oil pollution in the Caspian a real environmental threat.

Huge increases in energy consumption over the past 20 years have contributed greatly to pollution levels as Iran's carbon emissions have nearly tripled over the same time span. Large numbers of old, inefficient cars on the road lacking catalytic converters account for much of the country's air pollution.

In addition, Iran's abundance of fossil fuel resources has tended to discourage the country's incentive to shift to cleaner alternative energy sources for its energy needs. As Iran continues to struggle with air pollution in the 21st century, however, the country likely will need to take a variety of tough measures in order to avert an environmental crisis.

Sources for this report include: Agence France Presse; AP Worldstream; BBC Summary of World Broadcasts; Calgary Herald; CIA World Factbook 2000; Deutsche Presse-Agentur; Dow Jones; Economist Intelligence Unit Viewswire; Financial Times; Foreign Broadcast Information Service; Gulf News; Hart's Africa Oil and Gas; Hart's Asian Petroleum News; Hart's Middle East Oil and Gas; Interfax; International Herald Tribune; Iran Brief; Middle East Business Intelligence; Middle East Economic Digest; National Post; Nefte Compass, New York Times; Oil and Gas Journal; Oil and Gas Investor; Petroleum Economist; Petroleum Intelligence Weekly; Pipeline and Gas Journal; Reuters; Turkish Daily News; U.S. Energy Information Administration, World Gas Intelligence, World Markets Online

COUNTRY OVERVIEW
President:Mohammed Khatami (since August 1997; reelected June 2001)
Supreme/Spiritual Leader:Ayatollah Ali Khamenei
Islamic Republic Proclaimed:April 1, 1979
Population (7/01E): 66.1 million
Location/Size:Middle East - between the Persian Gulf and the Caspian Sea/636,296 square miles
Major Cities:Tehran (capital), Meshed, Isfahan, Tabriz, Shiraz, Ahwaz, Kermanshah, Qom, Ardebil, Qazvin
Languages: Persian and Persian dialects (58%), Turkic and Turkic dialects (26%), Kurdish (9%), Luri (2%), Baluch (1%), Arabic (1%), Turkish (1%)
Ethnic Groups:Persian (51%), Azerbaijani (24%), Gilaki and Mazandarani (8%), Kurd (7%), Arab (3%), Lur (2%), Baluch (2%), Turkmen (2%), other (1%)
Religion:Shi'a Muslim (89%), Sunni Muslim (10%), Zoroastrian, Jewish, Christian, and Baha'i (1%)
Defense (8/98):Army (350,000), Revolutionary Guard (120,000), Navy (20,600), Air Force (40,000-45,000), army reserves (350,000)

ECONOMIC OVERVIEW
Minister of Economic Affairs and Finance: Dr. Tahmasb Mazaheri
Currency: Rial (R)
Exchange Rates (10/17/01): R 1,741 per $U.S. for official budget transactions and essential goods imports and exports, as well as external debt service; "floating" Tehran Stock Exchange (TSE) rate of around 8,000 per $U.S.
Gross Domestic Product (GDP, at market exchange rates) (2001E): $76.8 billion
Real GDP Growth Rate (2000E): 5%-5.9% **(2001F):** 4.4%
Inflation Rate (2000E): 14.5%% **(2001F):** 14.4%
Unemployment Rate (2000E): 12.7% (unofficially, 16%-25%)
Current Account Balance (2000E): $4.1 billion **(2001F):** $2.1 billion
Major Trading Partners (2000): Japan, Italy, Germany, China, France, United Arab Emirates
Merchandise Exports (2000E): $21.9 billion
Merchandise Imports (2000E): $16.8 billion
Merchandise Trade Surplus (2000E): $5.2 billion
Major Export Products: Oil and oil products (90%), carpets, pistachios
Major Import Products: Industrial supplies (37%), machinery (30%), consumer goods (18%)
Oil Export Revenues (1999E): $13.9 billion **(2000E):** $23.6 billion

Oil Export Revenues/Total Export Revenues (2000E): around 90%
Total External Debt (3/01E): $21.2 billion

ENERGY OVERVIEW

Minister of Energy: Habibollah Bitaraf
Minister of Petroleum: Bijan Namdar-Zanganeh
Atomic Energy Organization of Iran: Gholamreza Aqazadeh
Proven Oil Reserves (1/1/01E): 89.7 billion barrels
OPEC Crude Oil Production Quota: 3.406 MMBD (as of September 1, 2001)
Crude Oil Production Capacity (2001E): 3.9 MMBD
Oil Production (January-July 2001E): 3.9 MMBD (of which, 3.8 MMBD is crude)
Oil Consumption (2001E): 1.2 MMBD
Net Oil Exports (2001E): 2.7 MMBD
Crude Oil Refining Capacity (1/1/01E): 1.48 MMBD
Major Crude Oil Customers: OECD Europe, Japan, China, South Korea
Natural Gas Reserves (1/1/01E): 812 trillion cubic feet (Tcf)
Natural Gas Production (1999E): 1.87 Tcf
Natural Gas Consumption (1999E): 1.94 Tcf
Recoverable Coal Reserves (12/97E): 213 million short tons (Mmst)
Coal Production (1999E): 1.07 Mmst
Coal Consumption (1999E): 1.84 Mmst
Net Coal Imports (1999E): 0.77 Mmst
Electric Generation Capacity (2001E): 27 gigawatts (around 90% thermal)
Electricity Consumption (1999E): 95.8 billion kilowatthours

ENVIRONMENTAL OVERVIEW

Vice President for Environmental Protection: Dr. Mrs. Masumeh Ebtekar
Total Energy Consumption (1999E): 4.7 quadrillion Btu* (1.2% of world total energy consumption)
Energy-Related Carbon Emissions (1999E): 84.3 million metric tons of carbon (1.4% of world total carbon emissions)
Per Capita Energy Consumption (1999E): 74.5 million Btu (vs U.S. value of 355.8 million Btu)
Per Capita Carbon Emissions (1999E): 1.3 metric tons of carbon (vs U.S. value of 5.5 metric tons of carbon)
Energy Intensity (1999E): 6,318 Btu/ $1990 (vs U.S. value of 12,638 Btu/ $1990)**
Carbon Intensity (1999E): 0.12 metric tons of carbon/thousand $1990 (vs U.S. value of 0.19 metric tons/thousand $1990)**
Sectoral Share of Energy Consumption (1998E): Industrial (42.1%), Residential (25.5%), Transportation (23.6%), Commercial (8.6%)
Sectoral Share of Carbon Emissions (1998E): Industrial (39.7%), Residential (24.4%), Transportation (27.3%), Commercial (8.6%)
Fuel Share of Energy Consumption (1999E): Oil (53.7%), Natural Gas (43.9%), Coal (0.9%)
Fuel Share of Carbon Emissions (1999E): Oil (57.5%), Natural Gas (41.2%), Coal (1.3%)
Renewable Energy Consumption (1998E): 391 trillion Btu* (300.6% increase from 1997)
Number of People per Motor Vehicle (1998): 27.7 (vs U.S. value of 1.3)
Status in Climate Change Negotiations: Non-Annex I country under the United Nations Framework Convention on Climate Change (ratified July 18th, 1996). Not a signatory to the Kyoto Protocol.
Major Environmental Issues: Air pollution, especially in urban areas, from vehicle emissions, refinery operations, and industrial effluents; deforestation; overgrazing; desertification; oil pollution in the Persian Gulf; inadequate supplies of potable water.
Major International Environmental Agreements: A party to Conventions on Biodiversity, Climate Change, Desertification, Endangered Species, Hazardous Wastes, Marine Dumping, Nuclear Test Ban, Ozone Layer Protection and Wetlands. Has signed, but not ratified, Environmental Modification, Law of the Sea and Marine Life Conservation.

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear,

geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.
**GDP based on EIA International Energy Annual 1999

OIL AND GAS INDUSTRIES

Organizations: The Ministry of Petroleum has overall responsibility for the country's energy sector. Companies function autonomously for the most part, but ultimately report to the Ministry. National Iranian Oil Company (NIOC) - oil and gas exploration and production, refining and oil transportation (reportedly reorganized in September 2000); National Iranian Gas Company (NIGC) - manages gathering, treatment, processing, transmission, distribution, and exports of gas and gas liquids; National Petrochemical Company (NPC) - handles petrochemical production, distribution, and exports; National Iranian Tanker Company (NITC) -- controls the second largest fleet of tankers in OPEC; National Iranian Oil Refining and Distribution Company (NIORDC) handles oil refining and transportation, with some overlap to NIOC.
Foreign Oil Company Involvement: BG, Bow Valley, BP, ENI, Gazprom, Petronas, Royal Dutch/Shell, Sheer Energy, Statoil, TotalFinaElf
Major Oil Fields: Agha Jari, Ahwaz (Bangestan), Azadegan, Bibi Hakimeh, Darkhovin, Doroud, Gachsaran, Mansouri (Bangestan), Marun, Masjid-e Soleiman, Parsi, Rag-e-Safid, Soroush/Nowruz
Major Refineries (capacity, bbl/d) (1/1/01E): Abadan (400,000), Isfahan (265,000), Bandar Abbas (232,000); Tehran (225,000), Arak (150,000), Tabriz (112,000), Shiraz (40,000), Kermanshah (30,000), Lavan Island (30,000)
Major Oil Terminals: Ganaveh, Kharg Island, Lavan Island, Sirri Island, Cyrus, Ras Bahregan, Larak Island
Gas Pipeline System: IGAT-1 transports associated gas from Khuzestan area oilfields to consumption centers in the north; IGAT-2 transports non-associated gas from the Kangan and Nar fields on the Persian Gulf coast near Bandar Taheri; IGAT-3, which would run from South Pars to Tehran, is planned. Evaluation also has begun on a possible IGAT-4 line from South Pars to industrial northern Iran.

Links

For more information on Iran, please see these other sources on the EIA web site:
EIA - Historical Energy Data on Iran
OPEC Fact Sheet

Links to other U.S. government web sites:
2000 CIA World Factbook - Iran
U.S. Treasury Department's Office of Foreign Assets Control
U.S. Iran-Libya Sanctions Act
U.S. State Department's Consular Information Sheet - Iran
Library of Congress Country Study on Iran
U.S Policy Towards Iran

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Permanent Mission of the Islamic Republic of Iran to the United Nations
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File last modified: October 19, 2001

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